

June 5, 1956

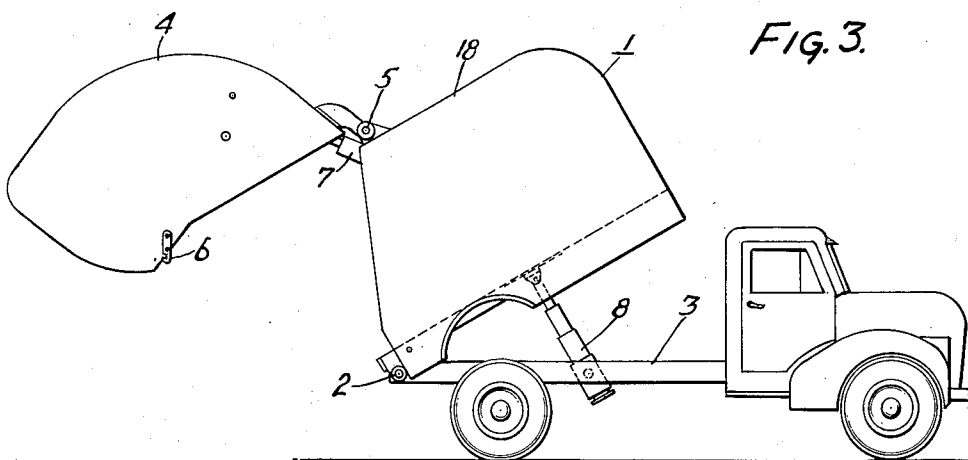
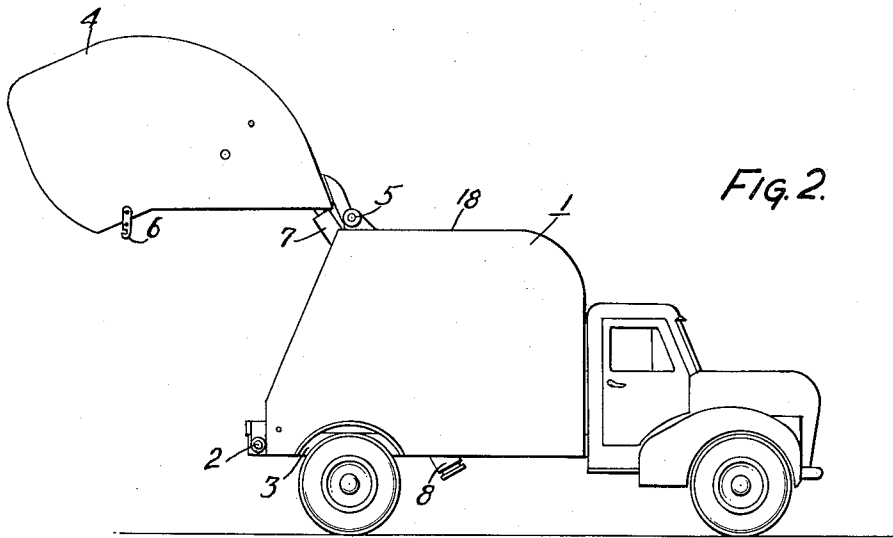
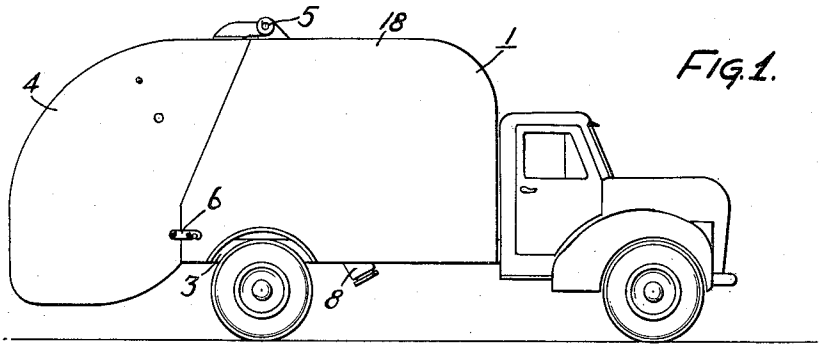
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2,748,964

REFUSE TRUCK PACKER LOADER

Filed April 13, 1953

4 Sheets-Sheet 1



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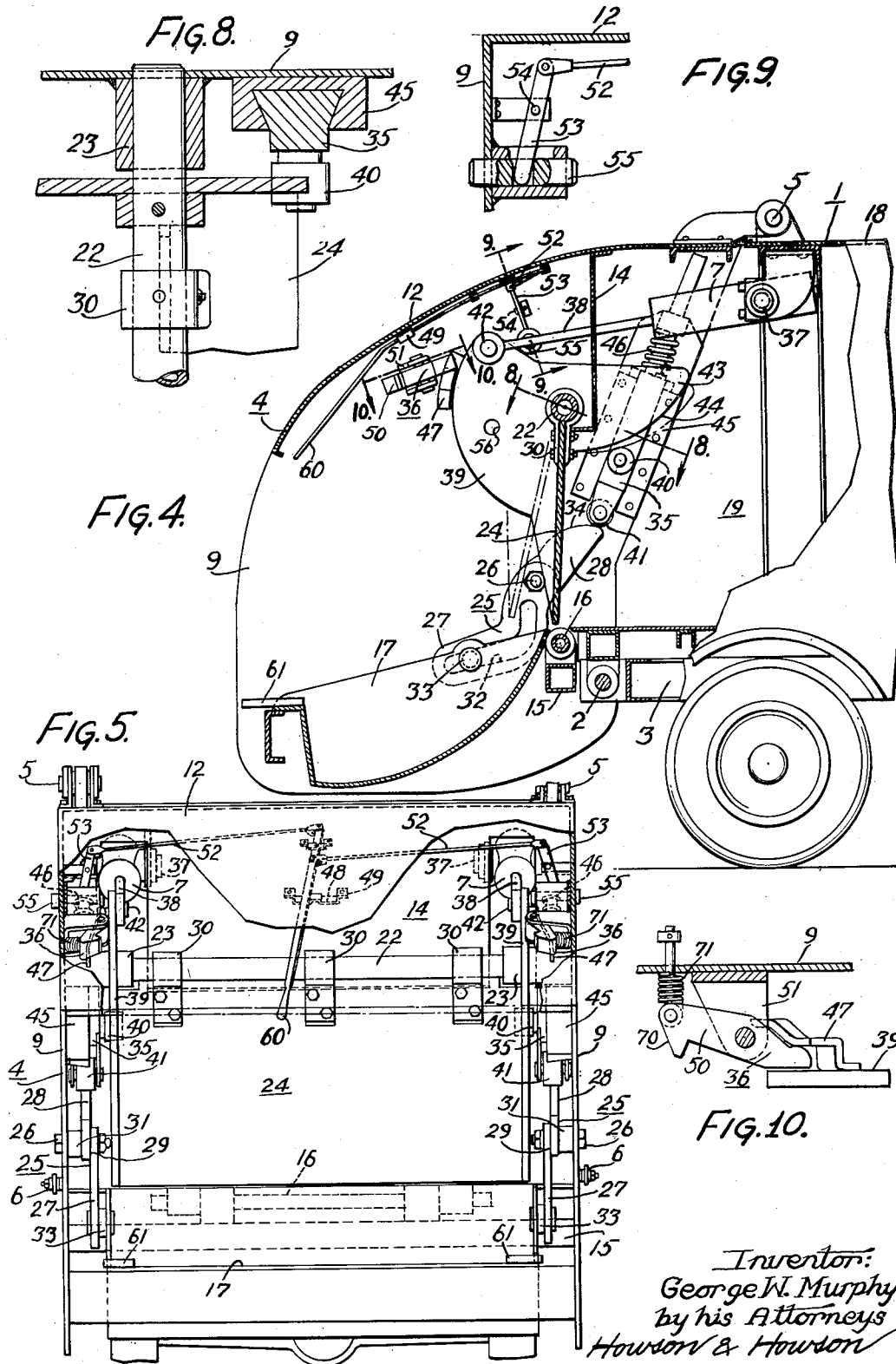
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REFUSE TRUCK PACKER LOADER

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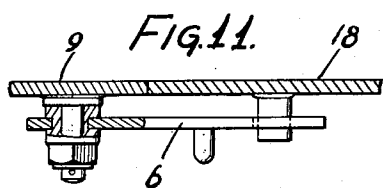


FIG. 6.

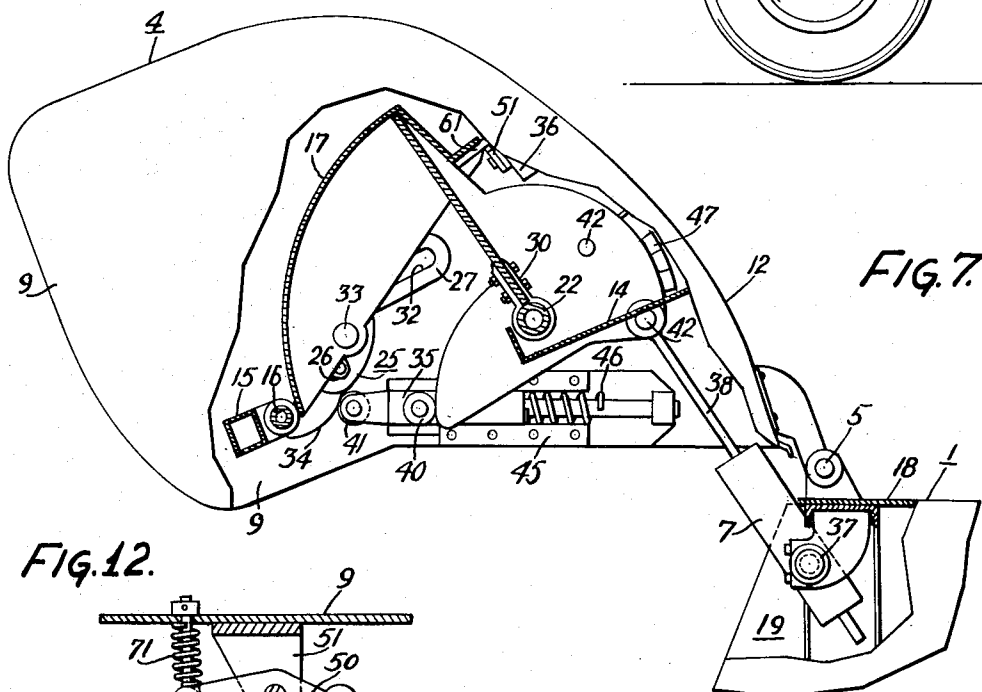
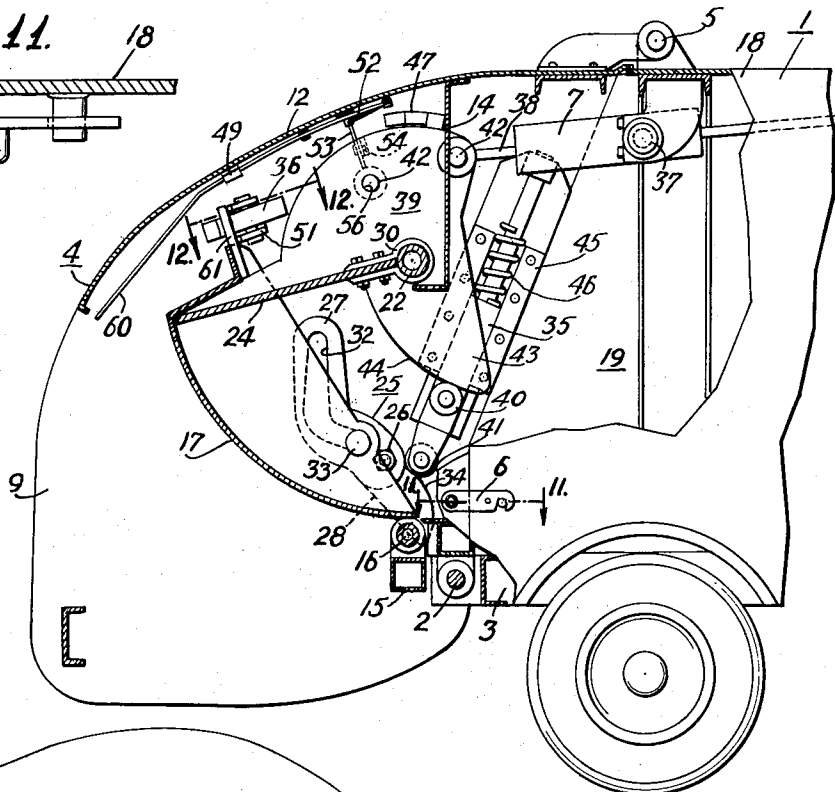
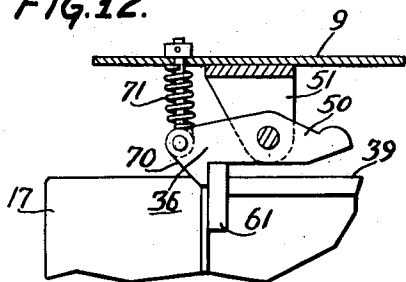


FIG. 12.



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FIG. 15.

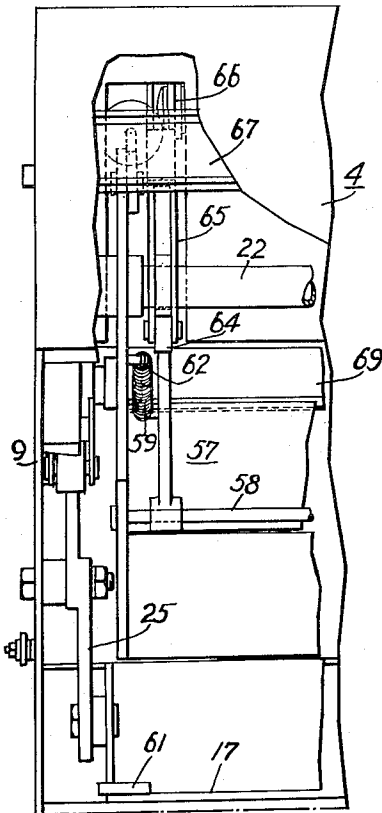


FIG. 13.

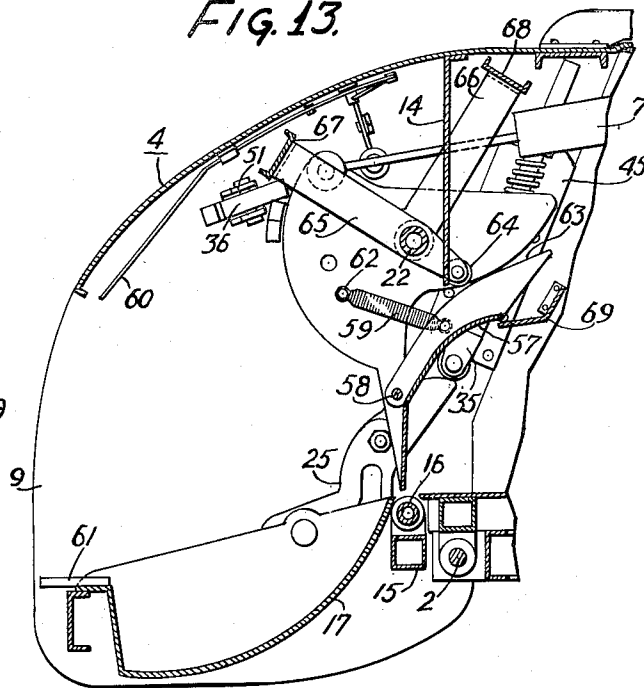
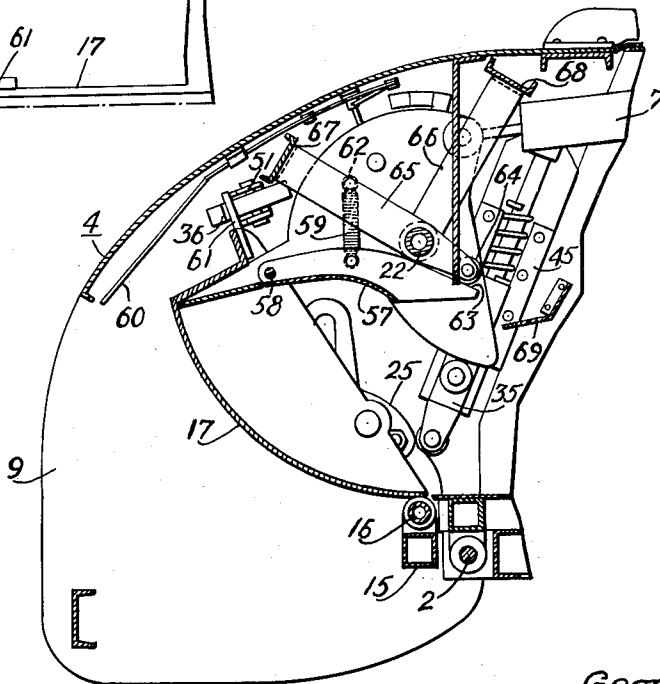


FIG. 14.



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2,748,964

REFUSE TRUCK PACKER LOADER

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9 Claims. (Cl. 214—503)

This invention relates to improvements in material handling devices and more particularly to improvements in refuse trucks of the type comprising an enclosed body and mechanism for loading and compacting the refuse materials therein.

A principal object of the invention is to provide a material handling device of the stated type having relatively simple and functionally improved loading and compacting mechanism.

A further object of the invention is to provide a material handling device of convenient form and generally improved functional characteristics.

Another object of the invention is the provision of a device of the stated type which is economical of manufacture and which exhibits greater efficiency than the prior known devices.

Another object of the invention is to provide a device of the stated type which is characterized by safety of operation and which can be operated with minimum exertion on the part of refuse collectors.

A more particular object of the invention is to provide a refuse truck body attachment wherein a relatively limited number of hydraulic ram jacks are employed to operate a packing plate and to raise a hopper into a position so that the packing operation is efficiently performed.

A still further object of the invention is to provide a refuse truck body attachment wherein the packing plate is capable of efficient handling of granular materials as well as other refuse.

The invention resides further in certain structural details hereinafter described and illustrated in the attached drawings wherein:

Fig. 1 is a vertical elevational view of a refuse truck showing the relation of packing means of the present invention to a refuse truck;

Fig. 2 is a vertical elevational view of the refuse truck of Fig. 1 but showing the tail gate mechanism in elevated position preparatory to dumping;

Fig. 3 is a vertical elevational view of the refuse truck of Fig. 1 but showing the truck body in the position it assumes when dumping;

Fig. 4 is an enlarged vertical elevational view, partly in section, of the refuse truck of the present invention showing the packing plate and hopper in position for loading;

Fig. 5 is a vertical elevational rear view partly broken away of the refuse truck of the present invention, on the same scale as Fig. 4;

Fig. 6 is a view similar to Fig. 4 but showing the packing plate and hopper in the position they assume just prior to the packing operation;

Fig. 7 is a view similar to Fig. 6 but showing the entire packing means in the position it assumes just prior to dumping;

Fig. 8 is a view taken substantially on line 8—8 of Fig. 4;

Fig. 9 is a view taken substantially on line 9—9 of Fig. 4;

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Fig. 10 is a view taken substantially on line 10—10 of Fig. 4;

Fig. 11 is a view taken substantially on line 11—11 of Fig. 6;

Fig. 12 is a view taken substantially on line 12—12 of Fig. 6;

Fig. 13 is an enlarged fragmentary sectional view of a modified form of the invention showing a form of packing plate capable of handling granular material as well as other refuse and showing the hopper and packing plate in the position they assume when the device is being loaded;

Fig. 14 is a view similar to Fig. 13 but showing the hopper and packing plate in the position they assume just prior to the packing operation, and

Fig. 15 is an enlarged fragmentary view of the modified form of the invention as observed from the left in Fig. 13.

With reference to the drawings and more particularly to Figs. 1 through 3 the refuse truck therein illustrated comprises a truck body 1 which is hinged at 2 to the chassis of the truck 3. A packing means 4 is hinged at 5 to the top of the truck body, the bottom of the packing means being secured in place by latches 6. The tail gate assembly may be elevated by means of hydraulic ram jacks 7 and the truck body may be independently elevated by means of underbody hydraulic hoist 8. The loading and packing operations are accomplished while the associated elements are in the position of Fig. 1 and the elements assume the positions of Figs. 2 and 3 only during the dumping operation.

The packing means comprises side walls 9, a combined top wall and rear end wall 12, and a partition 14 extending downwardly from the top wall. A frame member 15 extends between the side walls and provides a mounting for a shaft 16 on which a refuse-receiving hopper 17 is hinged. A shaft 22 extends between the side walls of the packing means and is rotatably mounted thereon at 23. As shown in Fig. 4 a packing panel 24 is rigidly secured to the shaft 22 and normally forms a closure for the otherwise open rear end of the receptacle 19 formed within the body 18 of the truck. Brackets 30 which are rigidly secured to the shaft 22 and rotate therewith, effect an even distribution of stresses throughout the packing panel.

It will be noted that the position of the hopper 17 in Fig. 4 is conducive to ready loading of refuse. The relatively little distance from the hopper to the street permits of ready lifting of refuse containers into position for emptying. When the hopper is loaded it is pivoted upwardly about the shaft 16 to the position shown in Fig. 6 by means of levers 25 which are pivoted about bolts 26 secured to the side walls, the levers being spaced from the side walls by sleeves 31 and each of which comprises two sections 27 and 28 rigidly secured together at 29 by welding or by other suitable means. Each section 27 is provided with an elongated arcuate slot 32 for the reception of a roller 33 rotatably secured to the side of the hopper. A cam surface 34 is provided on each section 28 for engagement with a plunger 35 slidably mounted on the proximate side wall 9, so that as these plungers 35 move downwardly against the cam surfaces 34 each section 27 is displaced upwardly causing the rollers 33 to follow the path of the arcuate slot and thereby elevating the hopper about its pivot 16. The engagement of the cam surfaces 34 with the plungers 35 is preferably effected through the medium of a roller 40 rotatably secured on the side of each plunger and likewise the engagement of the plunger with the cam surface 34 may be effected through the medium of a follower 41 rotatably mounted on the plunger. It is to be understood that other

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equivalent means may be substituted to effect this result.

As clearly shown in Fig. 6 the lugs 61 of the hopper are engaged by latches 36 once the hopper reaches its uppermost position, and the hopper is retained in this elevated position while the packing panel returns towards the position shown in Fig. 4, forcing refuse from the hopper into the receptacle. Each of these latches comprises a lever 50 fulcrumed on a bracket 51. The lever is provided with a cam surface 70 and is normally urged from the side walls by compression spring 71. Fig. 12 shows the position of a latch when the hopper is engaged. The packing panel or plate 24 moves clockwise as the hopper moves upwardly about the shaft 16 so that at the end of the travel of the packing panel the marginal edges thereof are in close proximity to the bottom of the hopper. It will be noted that the bottom of the hopper is shaped on the arc of a circle which is substantially concentric with the pivot 23 so that the distance between the marginal edges of the packing panel and the hopper bottom will remain constant on the down stroke of the packing panel.

The actuation of the packing panel and the hopper is accomplished by a single means or source of power and this means constitutes an important feature of this invention. The hydraulic ram jacks 7 which are pivotally mounted at 37 to the side walls of the truck body are provided with elongated piston rods 38 which are pivotally secured to rotors 39 at 42. These rotors are rigidly secured to each end of the packing panel and are provided with forwardly extending wing portions 43 having cam surfaces 44. It will be apparent that as the rods move to the right in Fig. 4 the packing plate will move clockwise to the position shown in Fig. 6. At the same time, the cam surfaces of the wing portion of the rotors 39 engage the plungers 35 which actuate the levers 25 and cause the upward movement of the hopper about the shaft 16. As will be apparent, the plungers 35 are slidably mounted in guides 45 and have associated therewith compression springs 46 to cushion the upward movement thereof resulting from the fall of the hopper as will now be described.

When the packing plate reaches the position shown in Fig. 6 the ram jacks reverse automatically and the piston rods 38 move to the left and cause the packing plate to travel counterclockwise while the hopper remains in the position of Fig. 6 so that refuse contained in the said hopper is forced therefrom into the receptacle. As the packing plate approaches the position of Fig. 4 the latches 36 are tripped by cams 47 secured in close proximity to the upper marginal edges of the rotors, as clearly shown in Fig. 10, so that the hopper drops downwardly, the fall being cushioned by the springs 46 as will be apparent.

When dumping of the refuse is desired the rotors 39 are locked to the side walls 9 so that the ram jacks move the entire packing means upwardly about the pivot 5. The underbody hoist 8 is then actuated to move the truck body to the position shown in Fig. 3. The hydraulic connections and source of hydraulic pressure for the jacks described above are well known in the art and need not be described here. Locking of the rotors with the side walls is effected through the medium of a locking means shown clearly in Figs. 5 and 9. Preparatory to dumping the handle 60 is moved upwardly adjacent the top wall 12 and then to the right to fall into the recess 48 of the bracket 49 which is secured to the underside of the top wall. As will be apparent, the handle thus actuated moves the links 52 outwardly as seen in Fig. 5 so that the links 53 which are fulcrumed at 54 move the pins 55 inwardly to engage apertures 56 in the rotors. It will be noted that disengagement of the rotors and the side walls is effected by reversing the above operation.

A modified form of the invention is shown in Figs. 13, 14 and 15. This modified form of the invention is intended to be used particularly where granular materials are handled and is adapted to force ashes and the like

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further into the receptacle so that a greater quantity of such materials may be handled. Considerable difficulty is experienced in the operation of refuse packers of the packing plate type when handling material of this type.

The present invention contemplates the provision of means effectively to "bulldoze" such materials so that the peak of the pile which forms in the receptacle adjacent the packing means when the truck receives its initial load is caused to fall inwardly into the receptacle thus greatly increasing the effective capacity of the receptacle. To this end a blade 57 is pivotally secured at 58 to a packing plate similar to that shown in Fig. 4 and is normally urged into engagement with the packing plate by the action of tension springs 59 which are secured at 62 to the sides of the rotors. As the packing plate moves downwardly from the position shown in Fig. 14 the cam surface 63 of the blades engages followers 64, which are fixedly secured to the packing means through the medium of frame members 65 and 66. Each frame member 65 is supported on the shaft 22 and is secured at the upper end thereof to a frame member 67 extending between the side walls of the packing means. Each support member 66 is secured at one end to a transverse frame member 68 and at the other end to the frame member 65. It will be apparent that as the packing plate moves from the position shown in Fig. 14 to the position shown in Fig. 13 the cam surface 63 of the blade 57 engages the follower 64 so that the blade moves forwardly and forces the peak of a pile of refuse inwardly. The blade 57 provides at the top of the packing plate a moment of force which cooperates with the moment of force at the bottom of the packing plate to force refuse further into the receptacle. In this connection it will be noted that a retaining plate 69 extending between the side walls of the truck body and removably secured thereto is provided to cooperate with the blade in effecting the above result. It will be understood that the partition 14 is suitably apertured in the modified form of the invention to accommodate the frame members 65 and 66.

It will be seen that a materials handling device is herein disclosed which carries out the objects of the invention as above set forth and is particularly adapted to effect the desired results. The hopper of the device is constructed and arranged in such a manner that loading thereof is greatly facilitated and exertion and consequent injury on the part of refuse collectors is diminished. It will be further seen that a safe device is provided in which the moving elements are shielded from the operators while the device is in motion.

While a certain embodiment of the present invention has been illustrated and described herein, it is not intended to limit the invention to such a disclosure and changes and modifications may be made therein and thereto within the scope of the following claims.

I claim:

1. In a refuse truck, a body providing a receptacle for the refuse, loading means at the rear of said body, said means comprising a pivotally supported member movable about its pivot between a pendent position, wherein it constitutes a closure for said receptacle, and a rearwardly elevated position affording access to the receptacle for loading, and comprising also a hopper supported for movement between a refuse-receiving position and a relatively elevated terminal position from which the said refuse may be discharged into the receptacle, the bottom of said hopper conforming in shape approximately to the segment of a cylinder and occupying a generally co-axial position with respect to the pivotal axis of said member when the hopper occupies the said terminal position so that the member may operate effectively to sweep the interior of the hopper, a common actuator for the member and the hopper, and transmission means operative by a continuous movement of the actuator in one direction to elevate the member and simultaneously to move the hopper to said

terminal position, and operative by a reverse movement of the actuator to move the member downwardly independently of the hopper so as to sweep the contents of the latter into the receptacle and to close the latter.

2. A refuse truck according to claim 1 wherein the transmission means comprises a first cam means movable with the loading member, a second cam means operatively connected to the hopper, and a plunger movable to an extended position by the said first cam means as the loading member is elevated and when so moved actuating the second cam means to elevate the hopper.

3. A refuse truck according to claim 2 including latch means for retaining the hopper in the said terminal position while the loading member is moved downwardly.

4. A refuse truck according to claim 3 wherein the hopper is returnable by gravity to the refuse-receiving position and wherein also resilient means is provided tending to retain the plunger in the extended position, said resilient means thereby acting through the said second cam means to cushion the hopper as it returns to the said refuse-receiving position.

5. A refuse truck according to claim 1 including a tail gate at the rear of said body constituting a support for the loading member and the hopper, said gate being mounted on the body for elevation to a position wherein the said member and hopper are remote from and leave the rear end of the receptacle unobstructed for discharge therefrom of contained refuse, and means for immobilizing the loading member with respect to the tail gate so that operation of the said actuator will effect an elevation of the tail gate.

6. A refuse truck according to claim 5 wherein the actuator consists of hydraulic cylinder means pivotally attached to the truck body and operatively connected to the loading member.

7. In a refuse truck, a body providing a refuse receptacle, a tail gate having top and side wall members mounted at the rear end of said receptacle, said tail gate having an opening at the back thereof and the forward end of said gate being in communication with the receptacle, a partition partially closing the said rear end of the receptacle, a shaft mounted in said tail gate, a packing plate on said shaft normally completing the closure of the rear end of the receptacle, a refuse-receiving hopper pivotally mounted in said tail gate, rotors at opposite sides of and connected to the packing plate, power means operable upon actuation to rotate the rotors, said rotors each having a cam surface, a plunger slidably mounted on each side wall of said tail gate and op-

eratively engageable respectively by the cam surfaces of said rotors when the latter are rotated, a lever pivotally mounted on each side wall of the tail gate and having a cam surface at one end for engagement respectively by the lower ends of said plungers, the other end of each of said levers having a cam slot therein, an element on each side of said hopper and entering the said slot of the proximate lever whereby the rotation of said rotors causes the hopper to pivot upwardly to a predetermined position, latch means operable to engage said hopper when said hopper reaches said predetermined position, said power means being operable upon actuation to rotate said rotors in the opposite direction so that said packing plate moves downwardly and forwardly whereby refuse in said hopper is removed therefrom and is forced by said plate into said receptacle, means operable to lock said rotors with respect to the side walls of said tail gate so that the said power means may operate to pivot the said gate upwardly so as to leave the rear end of the receptacle unobstructed for dumping of the refuse from the latter.

8. A refuse truck according to claim 7 wherein the bottom wall of the hopper describes a segment of the surface of a cylinder, wherein further the packing plate shaft and the pivotal axis of the hopper are spaced so that in the said upper predetermined position of the hopper the said bottom wall lies substantially co-axial with the said shaft whereby the outer edge of the packing plate will move adjacent to the bottom wall of the hopper when the plate moves downwardly to clear the refuse from the hopper.

9. A refuse truck according to claim 7 wherein the packing plate comprises a blade pivotally mounted thereon and wherein further the tail gate comprises means engageable with the blade when the packing plate in its downward movement approaches the inner end of the hopper for urging the blade forwardly to supplement action of the plates tending to pack the refuse into the receptacle.

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